Section III: Current Usage of Medication in NATO Aircrew Medication Database

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INTRODUCTION

In April 1997, Working Group 26 undertook to facilitate international collaboration in determining the suitability of medications for use by military aviators. The group is focusing on two areas: 1) current knowledge and experience in use of medications by military aviators, and 2) means of international collaboration on the study of new medications for use by military aviators. To simplify the task, while still including the vast majority of drugs used in aviators, the group discussion decided to focus on eight disease categories: Hypertension, Malaria Prophylaxis, Asthma, Allergic Rhinitis, Allergic Dermatitis, Other Manifestations of Allergy, Hyperlipidaemia and Disorders of the Digestive System. Furthermore it was decided to see which drugs for operational use were thought to be important.

Attempts to get information from every NATO country resulted in responses from Belgium, Canada, France, Great Britain, Germany, Greece, Italy, Netherlands, Spain and USA. Later, the Czech Republic, Hungary and Poland also responded. Information about the fields of interest was gathered with the help of two questionnaires. The results of this "who is using what and when" will be explained in the rest of this article.

It must be noted that the information in this monograph concerning drug usage by different countries represents actual usage at one point in time, and may have changed even by the time of publication. The information is primarily useful to illustrate which drugs are generally considered safe, which are forbidden, and so on. It should also be noted that methods of approval vary between countries, some of which are detailed later under the "Matrices" section. For some countries, the listed medications represent defined policy; for others, whose practice may be to give their aviation medicine specialists guidelines as opposed to specific drug policy, the listed drugs represent actual usage.

QUESTIONNAIRE ON MEDICAL TREATMENT AND FLYING

For any drug used to treat one of the eight disease categories each country completed a questionnaire. (A blank questionnaire has been added as Annex A.) The following questions were asked:

a. Disease category. (Hypertension, Malaria Prophylaxis, Asthma, Allergic Rhinitis, Allergic Dermatitis, Other Manifestations of Allergy, Hyperlipidaemia, Disorders of the Digestive System).

b. (Main) indication(s) for the drug. While a drug may have a number of indications, only the main one is mentioned here. (Since we are directly concerned with the possible negative effects of the drug on the performance of the aviator, rather than the efficacy of the drug in the treatment of the disease, which is assumed, the same restrictions for use will usually exist even where the drug is used for more than one indication.)

c. Threshold (indications) for therapeutic use of the drug in military aviators. In many of cases, non-drug therapy will be used initially to treat a disease. Also, if drug treatment has an influence on performance, different threshold values may be used for flying and non-flying personnel.

d. Generic name of the drug. Since generic names are more likely to be identical than are proprietary names, the use of these names makes it easier to compare information.

e. Proprietary name if specified by the nation's policy. The proprietary name is considered to be important in unusual cases, when for some pharmacokinetic reason the same product made by different manufacturers gives different results.

f. Range of doses permitted for military aviators. The dosage range needs to be specified when higher doses might give (more) negative side effects in regard to flying performance.

g. Acceptable duration of use of the drug in military aviators. When the risk of a negative effect on health or performance increases over time, a limit on duration of use for a specific drug might be necessary. Other drugs might be used indefinitely as long as no side effects occur.

h. Required duration of grounding after initial use of the medication. For most drugs it takes time to reach a steady state, during which a number of unwanted effects might develop. This is particularly important for those drugs that show large inter-individual differences.

i. Required evaluation before clearance to perform flying duties while on medication. Every person reacts individually to a given drug. Therefore, testing might be indicated to determine whether the individual has reacted to the treatment as expected.

j. Required special evaluation before clearance while taking the medication. In some cases a pilot has to perform under extreme conditions, but it is usually impossible to predict in what way the performance under such conditions has been changed by his medication. Therefore, special tests may be needed, for instance to evaluate the effect of antihypertensive therapy on G tolerance in a controlled situation before allowing the aviator to return to the high performance environment.

k. Required restrictions on flying duties while using the medication. The ideal drug has no effect on flying performance, but the ideal drug does not exist. On the other hand, grounding everybody who requires drug therapy is not acceptable either. The side effect profile of a drug might preclude a pilot from flying in a high performance aircraft, but he might be able to fly transport planes.

l. Rules governing re-evaluation of an aviator using the medication (Required Monitoring). As always when treating a disease, it is necessary to monitor the progress of the disease under treatment, and to reassess whether the drug may affect flying performance at a later date.

m. Extent of aeromedical experience with the medication in military aviators. Number of Years in Aircrew. Number of patients. In order to be able to compare data from different countries it is important to know the aeromedical experience with this drug. With large numbers over a long time, the absence of side effects is significant.

n. Aeromedical research performed (in-house) on the medication. Not every country is able to perform research with every drug. Therefore it is helpful to know who can be contacted for detailed information in a specific area.

o. In use/no longer in use/in study. Self-explanatory.

p. Remarks. This section is for comments that did not fit in with any of the other questions, or perhaps for elaboration of an earlier answer.

The information that was gathered this way was combined into a electronic database for easier access and distribution. In this database three extra fields were added:

q. Country. Self-explanatory.

r. ATC code. ATC stands for Anatomical, Therapeutical and Chemical. This code has been developed by the World Health Organisation (WHO) to be able to compare all kinds of data concerning drugs. Drugs are divided into fourteen major groups, depending on the organ system targeted. Within each division, there are further levels of clarification based on therapeutic use. The fifth and last level identifies the specific drug. More information about the ATC code can be found on the Internet at www.whocc.nmd.no, the WHO Collaborating Centre for Drug Statistics Methodology.

s. DDD. The daily defined dose, the average daily maintenance dose in adults when a drug is used for its main indication, has a relation with the ATC code and is used in drug statistics to be able to compare consumption.

MATRICES

The database contains a plethora of information. To simplify this, for seven disease categories (no information had been submitted for "Other Manifestations of Allergy") a matrix was created with the countries listed above, and the drugs listed along the left margin. Then, starting with the information from the database, and later completed

by the members of the Working Group for each drug the following codes were added:

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no specific information

The first two categories are reasonably self-explanatory. "Used for aircrew" means that the drug is approved/used in aviators without restriction to certain types of airframe, or restriction to as or with co-pilot status, or similar constraints; routine aeromedical oversight, such as a grounding period for observation, et cetera, still applies in these cases. "Used with restriction" means that some restriction, such as usage limited to aircraft not capable of sustained high G maneuvers, is in place. "Forbidden" implies that the approval authority had specific reason to prohibit the use of that drug in their aviators. "No specific information" means that, while there is not reason to specifically prohibit the use of that drug, it is not employed for any of a number of reasons, such as lack of availability in that country, or lack of interest in it because an equivalent drug has successfully been used with good results.

Thus, it is possible to see at a glance what type of medication is used or forbidden by what country. For more detailed information, particularly about restricted use, one could then go back to the database. The matrices have been added as Annexes C through H.

As noted earlier, these lists are useful to determine which drugs are widely deemed to be safe, and which drugs are specifically forbidden. It is unwise to directly compare lists across countries, since methods of approval vary. In Greece and France, aviators are evaluated at a central location at least annually. If an aviator is begun on a chronic medication by his flight surgeon, the choice is made locally, although in the Greek Air Force there is a guideline that recommends certain drugs. In neither case is there a forbidden list, although local flight surgeons are kept updated about drugs that are likely to be disapproved after central review. Italy follows a similar policy, although any time a chronic drug is begun, a package must be submitted immediately to the central authority. In the US Air Force, with rare exceptions listed in the applicable regulation, medication use is disqualifying, and waiver must be applied for; thus, although medical examinations are not routinely performed at a central location following training, medication usage is tracked. The governing regulation does list drugs that are routinely waivered, and others that are not considered waiverable, but this list is not considered comprehensive. Flight surgeons in the Canadian forces are provided with a list of approved medications, and a list of forbidden drugs. If an aviator is begun on an approved drug, no central oversight is required. Drugs which are on neither list may be approved by exception after submission to the central authority. Aviators do not undergo regular periodic re-evaluations at a central location. In the UK, written guidelines concerning drug usage are provided by the Surgeon General, with specific drugs being allowed, and other drugs or even groups of drugs being specifically forbidden. Again, if an aviator is begun on an approved drug, central oversight is not required, and aviators do not undergo regular periodic re-evaluations at a central location.

OPERATIONAL MEDICATION

A second questionnaire was submitted to find out what medications were of interest for operational use.

Definition: Operational medications are those pharmacological agents administered to healthy people to improve force effectiveness, in areas as diverse as vigilance, performance enhancement, and circadian adaptation. The Working Group decided not to address prophylaxis for chemical agents. Agents for disease prophylaxis, such as anti-malarials, are in a curious position. Since they are widely viewed as therapeutic drugs, they were addressed under the previous section, and yet for military purposes they are used more in an operational manner, in that they are typically supplied to large numbers of healthy personnel in a particular operational environment.

The questionnaire contains the following items (See also Annex B):

a. Operational purpose. What is one trying to achieve with the use of this drug?

b. Criteria for use. Who is allowed to use it? Under which circumstances is he allowed to use it?

c. Generic name of the drug.

d. Proprietary name if specified by the nations policy.

e. Range of doses permitted for military aviators. Here even more than in therapeutic use of drugs the dose is important because of possible side effects, and because titration of dose to the individual is likely to be impractical.

f. Acceptable duration of use of the drug in military aviators. Under operational circumstances, an indefinite period of use is almost never an option. Indeed, sometimes only a single dose is acceptable.

g. Restrictions on repetitive use. Can a drug be used whenever it is thought to be necessary? Can it only be used a certain number of times? Does one have to wait a certain amount of time before it can be used again?

h. Required ground testing prior to operational use. Sometimes an individual adverse response is likely to a given drug, such that ground testing is considered mandatory.

i. Operational restrictions on flying duties while using the medication. Does using the drug mean operational restrictions have to be made?

j. Follow-up reporting required. Does the pilot have to report his experience with the drug to a flight surgeon?

k. Extent of aeromedical experience with the medication in military aviators. How many years has it been used in aircrew? How many people have used it?

l. Research / observations including drug-interactions. Did the country do any research or did it rely on, for instance, literature? What kind of reactions did the flight surgeon see?

m. In use / no longer in use / in study.

o. Remarks.

This information was not combined into an electronic database for two reasons. First, it concerned only a small number of medications, and second the information given by the different countries was likely to be sensitive. Thus, only a paper review has been made. This review shows the fields of interest in this area and can point out recommendations for further studies.

FUTURE DEVELOPMENT

The database and the matrices for therapeutic medications contain a lot of information. It is very important to keep this information up to date. This means not only working on the current categories but also adding new ones. It needs to be a living document.

In order for this to occur, a person or institute has to take the responsibility of asking the member countries on a regular basis whether or not their information is still correct. Also, it should be determined how each country can get the information. The Internet is a fast way, but not a safe way, and some of the information, even about therapeutic drugs, although not highly classified, might be sensitive. Another possibility is a custodian who sends the information on request on a disk or (if necessary, encrypted) by e-mail.

Which direction this effort should take has to be determined.

ANNEXES

A – Questionnaire therapeutic medications
B – Questionnaire operational medications
C – Matrix asthma
D – Matrix allergic dermatitis
E – Matrix allergic rhinitis
F – Matrix disorders of the digestive system
G – Matrix hypertension
H – Matrix hyperlipidaemia
I – Matrix malaria prophylaxis

Annex A

Information Questionnaire AMP/Working Group 26

Subject: Therapeutic Medications

Disease Category:	Hypertension Malaria Prophylaxis Asthma Allergic Rhinitis	Allergic Dermatitis Other Manifestations of Allergy Hyperlipidaemia Disorders of the Digestive System
(Main) indication(s) for the drug:		
Threshold (indications) for therapeutic use of the drug in military aviators:		
Generic name of the drug:		
Proprietary name if specified by the nations policy:		
Range of doses permitted for military aviators:		
Acceptable duration of use of the drug in military aviators:		
Required duration of grounding after initial use of the medication:		
Required evaluation before clearance to perform flying duties while on medication:		
Required special evaluation before clearance while taking the medication:		
Required restrictions on flying duties while using the medication:		
Re-evaluation rules for the restrictions while flying using the medication (Required Monitoring):		
Extent of aeromedical experience with the medication in military aviators. Number of Years in Aircrew: Number of patients :		
Aeromedical research performed (in-house) on the medication:		
In use / no longer in use / in study		
Remarks:		

Annex C

Asthma **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
acetylcysteine	u	u		u		u	u	u	**				
beclometasone	u	u		u		u	u*	u	**	u			
bromhexine	u	u		u		u	u	u	**		u		u
budesonide	u	u		u			u	u	**	u			
carbocysteine	u	u		u		u	u		**		u		
clobutinol						u			**				
cromoglicicacid	u	u	u*	u	u*	u	u	u	**	u			
desensitization		u	u	u			u	u	u	u			u
fenoterol		u*		u		u	f		**				u
inhaledbeta-2agonist	f	u*	u*	u	u*	u	f	u*	**	u*			
inhaledcorticosteroids	u	u	u*	u	u*	u	u*	u	**	u			
ipratropiumbromide		u				u	u*	u*	**	u*			
nedocromil		u		u				u	**	u			
oxolamine						u			**				
prednisone(oral)		f		u		f	u	f	**	f			u
salbutamol	f	u*		u*	u*	u*	u*	u*	**	u*			

Be	Belgium	It	Italy	CZ	Czech Republic
F	France	NL	The Netherlands	Hun	Hungary
GB	Great Britain	Sp	Spain	PL	Poland
Ge	Germany	USA			
Gr	Greece	CA	Canada		

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no policy or no experience
**	For the USA, asthma is disqualifying for flying; control by medications, since rarely complete, is considered inadequate to allow a return to flying status

Annex E

Allergic Rhinitis **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
astemizole	f	f	f	f				u*	f	f			u
beclometasone	u	u	u*	u		u	u	u	u	u			
budesonide	u	u	u*	u	u		u	u	u	u			
cetirizine	u	u*	f	f		u	f	u	f	u*			
cromoglycicacid	u	u	u	u		u	u	u	u	u	u		
fexofenadine			f						u	u			
flunisolide		u				u	u		u	u	u		
fluticasoneproprionate	u				u		u	u	u	u			
levocabastine				u*			u			u	u		
loratadine	f	u*	u	u*	u	u	u*	u	u	u			
nacetylaspartylglutamique		u											
naphazoline	u	u				u				u			
nedocromil		u			u			u					
oxymetazoline	u	u				u	u	u	u*	u			
rhgnatriichloridi0,9%							u	u		u			
steroids/decongestants		u	u	u		u		u*		u			
terfenadine	f	f	f	f			f			f			
triamcinolone	u	u						u*	u	u			u
xylometazoline		u		u		u	u			u			u
prednisolone(oral)		f	u				u*		f				

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GB	Great Britain	Sp	Spain	PL	Poland
Ge	Germany	USA			
Gr	Greece	CA	Canada		

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no policy or no experience

Annex F

Disorders of the digestive system **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
alginatesodium		u					u	u					
alizapride	f	f				f	f						
antacids	u	u	u	u	u	u	u	u	u	u	u		u
bismuth(subsalicylaat)	f			u		u			u	u			u
butylscopolamine	f	f		f		f	f			f			u
cimetidine	f	u		u*		u	u*	u		u	u		u
cisapride	f	f		f		u	f	u	f	f	u		
codeine		f	u*	f		f	f	u*	f	f			u
difenoxylate	f		f					u*			u		
domperidone	u	u*				u	u	u					
doxycycline		u		u	u	u	u	-	u	u			u
famotidine	u	u		u*		u	u*	u		u			u
flavoxate	f			f		f							
floroglucinol	f	u											
isopropamide	f												
lansoprazole	u	u	f			u		u		u			
loperamide	u	u	u*	u*		u	u	u*		u	u		u
mebeverine	u	u		u		u	u	u					
mesalazine	u	u*	u*	u	u*	u*		u*	u	u			
metoclopramide	f	f		u*		f	f	u*	f	f			u
misoprostol	f	f						f		u			
nizatidine	u	u					f						
norit	u						u						
omeprazole	u	u	u*	u*	u	u	f	u	u*	u	u		
otiloniumbromide	u					u							
oxybutynine	f	f							f				
pantoprazole	u	u				u		u					
pinaverium	f	u				f							
propantheline	f	f				f	f		f				
ranitidine	u	u	u*	u*	u	u	u*	u	u	u			u
silymarine													
sucralfate	f	u		u		u	u	u	u	u			
sulfasalazine	u	f		u		f	u*	u*	u	u*			u
tiëmonium	f	f											
trimebutine	u	u				u							

Be Belgium
F France
GB Great Britain
Ge Germany
Gr Greece
It Italy
NL The Netherlands
Sp Spain
USA
CA Canada
CZ Czech Republic
Hun Hungary
PL Poland

u used for aircrew
u* used with specific restrictions or recommendations
f forbidden
blank no policy or no experience

Annex G

Hypertension **(Current as of 01 September 2000)**

Drug		Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
alpha1blockers	α1SL	f	f	f		f	f	f		f	f			
prazocine	α1SL	f	f				f	f	f					u
terazosine	α1SL	f					f							
urapidil	α1SL	f					f	f	f					u
yohimbine	α2SL	f					f	f						
fenoxybenzamine	αSL	f					f	f	f					
fentolamine	αSL	f					f	f	f					u
acebutolol	β1SL				u		u				u*	u		u
atenolol	β1SL	u	u	u*	u	u*	u	u*	u*		u*	u		
betaxolol	β1SL											u		
bisoprolol	β1SL		u		u	u*	u					u		
metipranolol	β12SL											u		
metoprolol	β1SL	f	u		u		u	u*			u*	u		u
propranolol	β12SL	f					u	f			f			u
nadolol	βSL(?)	u												u
pinacidil	(?)	f												
benazepril	Aceinhibitor	f												
captopril	Aceinhibitor	u	u		u	u	u	u*	u					u
cilazapril	Aceinhibitor	u												u
enalapril	Aceinhibitor	u	u	u*	u	u	u	u*	u		u	u		
fosinopril	Aceinhibitor	u			u						u			
lisinopril	Aceinhibitor	u	u	u*	u	u	u	u*	u	u	u			
perindopril	Aceinhibitor	u	u									u		u
quinapril	Aceinhibitor	u				u	u				u			
ramipril	Aceinhibitor	u	u		u	u					u	u		
trandolapril	Aceinhibitor											u		
amlodipine	Caantagonist	u*	u*	u*		u*	u	f				u		u
diltiazam	Caantagonist	u*			u		u	f	u			u		u
felodipine	Caantagonist	u*	u*			u*	u	f						u
isradipin	Caantagonist							f				u		
nifedipine	Caantagonist	u*			u		u	f						
nimodipine	Caantagonist	u*					u	f						u
noxonidine	Caantag.(?)													
verapamil	Caantagonist				u		u	f				u		u
candersartan	Angiotensin II antagonist													
losartan	Angiotensin II antagonist	u	u				u							
valsartan	Angiotensin II antagonist													
spironolactone	Diuretic	u*				f	u							u
triamt.&epitizide	Diuretic							u						
triamtereen	Diuretic				u			u		u	u			u
furosemide	Diuretic	f	f				f	f	f					u
bendrofluazide	Thiazide			u										
Chlorothiazide & amiloride	Thiazide		u			u		f	u			u		
Hydrochlorothiazide & triamterene	Thiazide	u*			u			f	u	u	u			u
hydrochlorothiazide	Thiazide	u*	u	u	u	u	u	f	u	u	u	u		u
indapamide	Thiazide	u*					u	f						u
thiazides	Thiazide	u	u	u	u	u	u		u	u	u	u		u
diazoxide	Vasodilatantia	f				f	f	f	f		f			

Drug		Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
hydralazine	Vasodilatantia	f			u		f	f	f		f			
minoxidil	Vasodilatantia	f					f	f	f		f	u		u

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Ge	Germany	USA			
Gr	Greece	CA	Canada		

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no policy or no experience

Annex H

Hyperlipidaemia **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
acipimox	f					f					u		
atorvastatin		u							u				
bezafibrate	f	u		u		u							
ciprofibrate	u										u		
clofibrate	f									f			u
colestipol	f			u			u	u	u				u
colestyramine	f	f	u*	u	u	f		u	u	u			u
fenofibrate	u	u		u		u				u	u		f
fibrates		u	u*			u				u	u		
fluvastatine	u	u		u		u		u		u	u		
gemfibrozil	u	u		u		u	u		u*	u	u		
lovastatin				u*		u		u	u	u	u		
nicotinicacid	f			f					f	u*			u
omega3oilyacid		u								u			
pravastatin	u	u	u*	u	u	u	u	u	u	u	u		
resins		f						u	u	u			
simvastatin	u	u		u*	u*	u	u	u		u	u		u

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Ge	Germany	USA			
Gr	Greece	CA	Canada		

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no policy or no experience

Annex I

Malaria Prophylaxis **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp	USA	CA	CZ	Hun	PL
atovaquone&proguanil													
chloroquine	u	u		u	u	u	f	u	u	u			
chloroquine&proguanil	u	u		u			f	u					u
doxycycline	u	u				u	u		u	u			u
mefloquine	f	f	f	f	u	u	f		f				
primaquine								u	u	u			u
proguanil	u			u		u	u	u					
pyrimethamine													u
pyrimethamine&dapson										u			

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GB	Great Britain	Sp	Spain	PL	Poland
Ge	Germany	USA			
Gr	Greece	CA	Canada		

u	used for aircrew
u*	used with specific restrictions or recommendations
f	forbidden
blank	no policy or no experience

Annex D

Information Questionnaire AMP/WG26

Subject: Operational Medications

Operational medications are those pharmacological agents administered to healthy people to improve force effectiveness in areas as diverse as vigilance, performance enhancement, circadian adaptation and disease prophylaxis.
Operational purpose:
Criteria for use:
Generic name of the drug:
Proprietary name if specified by the nations policy:
Range of doses permitted for military aviators:
Acceptable duration of use of the drug in military aviators:
Restrictions on repetitive use:
Required ground testing prior to operational use:
Operational restrictions on flying duties while using the medication:
Follow-up reporting required:
Extent of aeromedical experience with the medication in military aviators Number of Years in Aircrew: Number of people : few / often used / …….
Research / observations including drug-interactions:
In use / no longer in use / in study
Remarks:

Allergic Dermatitis **(Current as of 01 September 2000)**

Drug	Be	F	GB	Ge	Gr	It	NL	Sp[2]	USA	CA	CZ	Hun	PL
betamethasone	u	u		u	u	u	u	u		u			
clobetasol	u	u		u		u	u	u					
desoximetasone	u	u		u	u		u						
hydrocortisone	u	u		u	u	u	u	u	u	u	u		u
prednisolone(oral)		f	u	u		u	u*	f	f	f			u
triamcinolone	u	u		u		u	u	u		u			u
cetirizine		u*	f				f		f				

Be Belgium
F France
GB Great Britain
Ge Germany
Gr Greece
It Italy
NL The Netherlands
Sp Spain
USA
CA Canada
CZ Czech Republic
Hun Hungary
PL Poland

u used for aircrew
u* used with specific restrictions or recommendations
f forbidden
blank no policy or no experience

[2] Only topical treatment

Annex B

Current as of 01 September 2000

Operational Medications	USA	USA	USA	USA
Operational purpose:	Avoiding motion sickness in student pilots	Counteract fatigue on long deployments; maintenance of alertness during extended missions	Sleep induction in operational environment	Sleep induction in operational environment
Criteria for use:	Student pilots with motion sickness which has become a conditioned response	Single pilot aircraft, only on deployments / redeployments which exceed 8 hours. Can be approved for individual mission use by Director of Operations – generally extended mission with long return flight.	Deployment or redeployment across time zones – may be employed in other operational scenarios – authorization by Major Command surgeon only	Deployment or redeployment across time zones – may be employed in other operational scenarios – authorization by Major Command surgeon only
Generic name of the drug:	Scopolamine patch	dextroamphetamine	temazepam	zolpidem
Proprietary name if specified by the nations policy:	Trans-Derm Scop	Dexedrine®	Not specified (Restoril® available)	Not specified (Ambien® available)
Range of doses permitted for military aviators:	1.5 mg patch to be used 4 hours before flight, and discarded afterwards	5 mg begun at onset of fatigue, then 5 mg q4h till just prior to landing	15mg - 30 mg	10 mg
Acceptable duration of use of the drug in military aviators:	Any flight, up to 3 flights before solo	Determined by mission length	Not more than 7 consecutive days	Not more than 7 consecutive days
Restrictions on repetitive use:	Same	Not expected – for deployment /redeployment only	No more than 20 days in 60 day period	No more than 20 days in 60 day period
Required ground testing prior to operational use:	None	5 mg at least 8 hours into a duty day, followed by another tablet 4 hours later	Single dose ground test	Single dose ground test
Operational restrictions on flying duties while using the medication:	May be used only by student pilot while flying with instructor – must be discontinued for the last three flights before solo – only recommended when motion sickness has become a conditioned response – otherwise prefer that students adapt through exposure	Not for use on operational missions – once begun, medication should be continued until landing	May fly no sooner than 12 hours post dose	May fly no sooner than 12 hours post dose
Follow-up reporting required:	Documented in medical record of student	Post mission debrief questionnaire after use	After action reports of deployments will document medication use	After action reports of deployments will document medication use
Extent of aeromedical experience with the medication in military aviators. Number of Years in Aircrew: Number of people: few / often used / …….	15+ unknown	15+ yrs (intermittent) unknown	15+ unknown	1+ unknown
Research / observations including drug-interactions:			No	No
In use / no longer in use / in study	In use	No longer in active use Potentially usable, but not used in years	In use	In use
Remarks:	Generally fails as a primary treatment for motion sickness, since it delays natural adaptation – useful when nausea has become a conditioned response to the flying environment	presently approved for use under above criteria	zolpidem preferred	zolpidem preferred to temazepam

Operational Medications	France	France	France	France
Operational purpose:	Vigilance sustainment in sleep deprivation context	Vigilance sustainment in sleep deprivation context Jet-lag therapy.	Prophylactic or recovery sleep period induction	Prophylactic or recovery sleep period induction
Criteria for use:	Operational conditions with no opportunities to take rest (wartime). Survival conditions (peacetime).	Operational conditions with no opportunities to take rest. Survival conditions.	SUSOPS & CONOPS	SUSOPS & CONOPS
Generic name of the drug:	modafinil	Slow release caffeine	zolpidem	Temazepam
Proprietary name if specified by the nations policy:	Modiodal®	To be defined	Stilnox®	Normison®
Range of doses permitted for military aviators:	100 to 600mg per day	300 to 600mg per day	5mg	
Acceptable duration of use of the drug in military aviators:	48 hours	48 hours	No prolonged administration	
Restrictions on repetitive use:	15 hours free of drug including a minimum 8-hour sleep period is necessary before an other waking period with modafinil could be planned	To be defined	See above	
Required ground testing prior to operational use:	Not necessary but desirable	Not necessary but desirable	Highly desirable	
Operational restrictions on flying duties while using the medication:	No restrictions	No restrictions	6 hours between the intake and take-off	
Follow-up reporting required:	Not necessary but desirable	Desirable	Desirable	
Extent of aeromedical experience with the medication in military aviators Number of Years in Aircrew: Number of people: few /often used / …….	7 years Few	Not applicable	Not applicable Few (self medication, flight surgeons)	Not applicable Self medication is probable in aircrews.
Research / observations including drug-interactions:	Modafinil may lower the power of hormonal contraception. Restriction of use in case of hypertension.	To be defined	Avoid other CNS drugs for potentiation effect	
In use / no longer in use / in study	U*	S	S	NI
Remarks:	Not applicable	Not applicable	Not applicable	

Current as of September 2000

Operational Medications	France	France	France	Great Britain
Operational purpose:	Vigilance sustainment in sleep deprivation context	Vigilance sustainment in sleep deprivation context	Jet-lag therapy.	Sleep disturbance in aircrew
Criteria for use:	SUSOPS & CONOPS	SUSOPS & CONOPS	Rapid oversea deployment	Sleep disturbance
Generic name of the drug:	Amphetamines	Pemoline	Melatonin and melatonin agonists.	Temazepam
Proprietary name if specified by the nations policy:			To be defined.	Normison (Wyeth)
Range of doses permitted for military aviators:			5mg for melatonin	10-20mg
Acceptable duration of use of the drug in military aviators:			To be defined.	As required
Restrictions on repetitive use:			To be defined.	Operational requirement only
Required ground testing prior to operational use:			To be defined.	7 days before om first occasion
Operational restrictions on flying duties while using the medication:			To be defined.	Usually not less than 12 hours prior to duty
Follow-up reporting required:			To be defined.	No
Extent of aeromedical experience with the medication in military aviators Number of Years in Aircrew: Number of people: few /often used / …….			Not applicable Self medication is probable in transport aircrews.	15 years
Research / observations including drug-interactions:				Extensive experience over 15 years
In use / no longer in use / in study	NA, NI	NA, NI	NA, I, S	use
Remarks:				

Operational Medications	Germany	Canada	Canada	Canada
Operational purpose:	Malaria prophylaxis	Maintain crew alertness/wakefulness	Sleep aid in operational setting	Circadian rhythm adjustment; sleep aid
Criteria for use:	mission to endemic areas	Contingency ops only	Operational setting only	Operational only, transition to ops with sig circadian shifts
Generic name of the drug:	Chloroquine and Proguanil	Modafanil	Zopiclone	Melatonin
Proprietary name if specified by the nations policy:	Resochin/Palludrine		Imovane	
Range of doses permitted for military aviators:	Chloroquine 500mg/week – 750mg/week acc. to body weight < or > 70kg; no duration defined	200-300mg	7.5 mg	1-10 mg
Acceptable duration of use of the drug in military aviators:	no duration defined	? extended duty day to 36 hours max	During operation only	During operations only
Restrictions on repetitive use:	Ophthalmological controls in long-term use of Chloroquine	Max 3 doses in aircrew		No
Required ground testing prior to operational use:	only general precautions	Preferred	Single dose on off-duty cycle preferred	No
Operational restrictions on flying duties while using the medication:	Considering possible gastrointestrial side effects intake of Chloroquine only on days w/o flying duty	No operational restrictions	No restrictions. Miinimum 8 hours prior to duty	No restrictions
Follow-up reporting required:	no	Yes – through Flight Surgeon	Yes- through Flight Surgeon	Yes – through Flight Surgeon
Extent of aeromedical experience with the medication in military aviators Number of Years in Aircrew: Number of people: few /often used / …….	no specific data at the institute	No operational experience	No operational experience	No operational experience
Research / observations including drug-interactions:	none	DCIEM sustained ops studies	DCIEM study demonstrated no performance decrement	DCIEM experiment demonstrated no performance decrement
In use / no longer in use / in study		IS	IS	IS
Remarks:		CF preference over amphetamines or caffeine based on experimental data only		Operational study in preparation

Current as of September 2000

Operational Medications	Canada	Canada		
Operational purpose:	Prevention of airsickness	Prevention of airsickness		
Criteria for use:	Non-pilot aircrew in training; Trained aircrew in maritime patrol	Non-pilot aircrew in training; Trained aircrew in maritime patrol		
Generic name of the drug:	Scopolamine+ ephedrine	Promethazine+ ephedrine		
Proprietary name if specified by the nations policy:		Phenergan		
Range of doses permitted for military aviators:	Scopolamine 0.3mg Ephedrine 30 mg	Promethazine 25 mg Ephedrine 30 mg		
Acceptable duration of use of the drug in military aviators:	Limited use in non-pilot aircrew during training Non-flight deck aircrew in maritime patrol under Flight Surgeon supervision	Limited use in non-pilot aircrew during training Non-flight deck aircrew in maritime patrol under Flight Surgeon supervision		
Restrictions on repetitive use:				
Required ground testing prior to operational use:	Yes. Single dose on non-flying day	Trial on non-flying day		
Operational restrictions on flying duties while using the medication:	Non-pilot aircrew only	Non-pilot aircrew only		
Follow-up reporting required:	Report to Central Medical Board	Report to Central Medical Board		
Extent of aeromedical experience with the medication in military aviators Number of Years in Aircrew: Number of people: few /often used / …….	20 years Infrequent use	20 years, infrequent use		
Research / observations including drug-interactions:				
In use / no longer in use / in study	IU	IU		
Remarks:				